

30 November 1962

MEMORANDUM FOR: Deputy Director (Support)

SUBJECT: Application of Bioelectronic Techniques and Systems to Monitor Human Physiological Responses.

REFERENCE: Memorandum to Deputy Director (Support) from Chief, Medical Staff. Subject: Recent Developments in Physiological Detection, dated 9 January 1961.

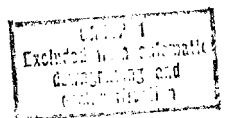
1. This memorandum contains recommendations in paragraph 5 for the approval of the Deputy Director (Support).

2. Background

a. Current practices in disease detection have evolved from the knowledge and analysis of symptoms and signs and the mechanisms of their development. As such, they are designed to uncover existing abnormalities and are conducted under circumstances which are essentially static. While these techniques, as currently employed in the Medical Staff, are effective in detecting overt illness, they are not adequate for diagnosing subclinical disease nor for obtaining a meaningful interpretation in terms of prognostic capability and performance.

b. Health, moreover, means more than freedom from disease--it is a state of anatomical, biochemical, and physiological competency with adequate reserve upon demand or stress. Aging and degenerative processes encroach on this reserve, decreasing it imperceptibly but progressively. In order to obtain a true estimate of health, methods are required, therefore, not only to ferret out pathological entities but also to determine human tolerance, endurance, and capacity. Dependable indicators are needed to designate the "pre-coronary", the "pre-diabetic", and the "pre-hypertensive" so that preventive measures can be taken before the disease becomes disabling and causes loss of manpower.

c. The measurement, recording, and interpretation of physiological responses are not unique and isolated activities of the Medical Staff; they are part of the fundamental techniques of the Office of Security in its responsibility for detecting deception during polygraphic

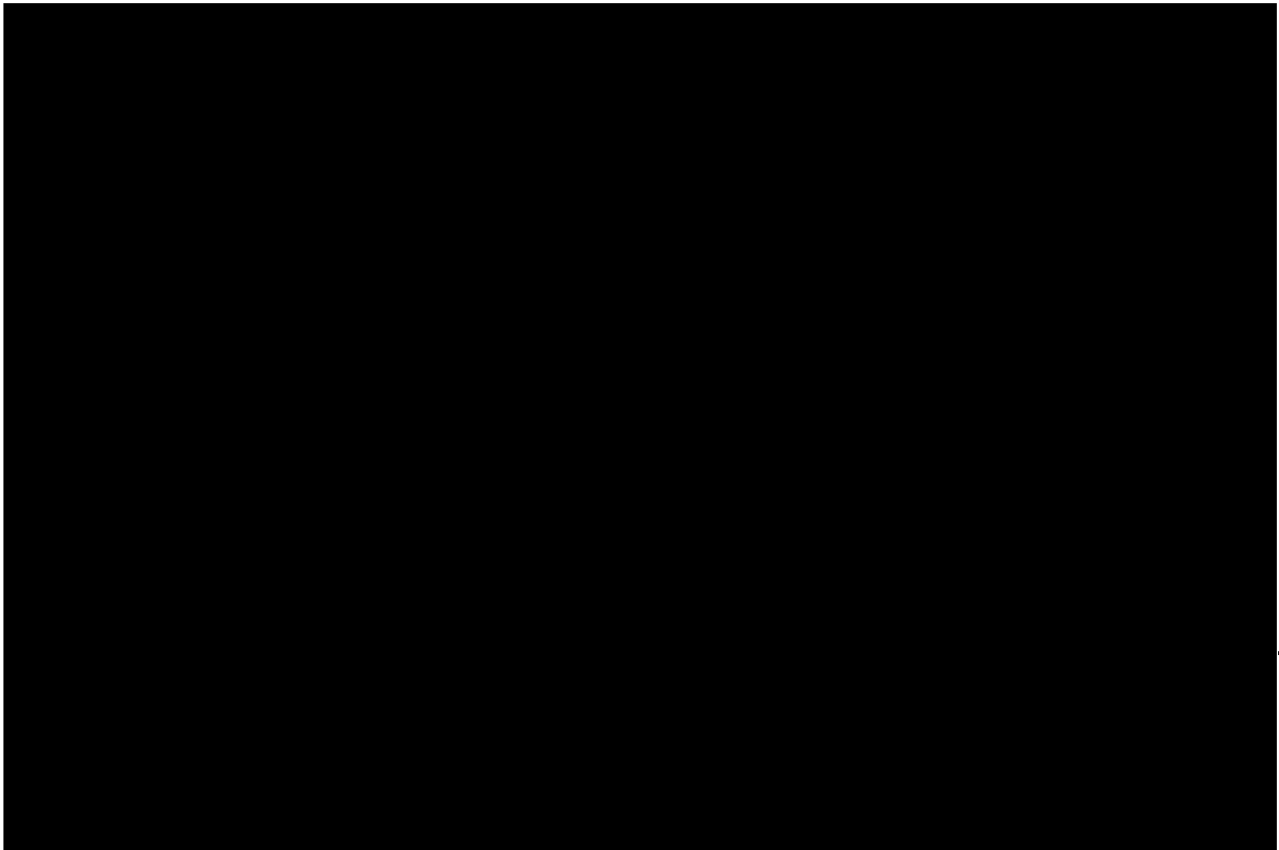


~~CONFIDENTIAL~~

interviews. The traditional polygraph machine measures three physiological responses. However, scientific investigations have clearly demonstrated that there are multiple response variables that change under stress. The study of these other variables with view to their utilization in the Agency security program is indicated to assure the continued development of this program.

d. Remarkable advances in biomedical electronics have provided a new methodology for studying the human dynamic organism. These techniques allow for severing the mechanical linkage between man and machine that had previously been necessary and which had been responsible for restricting dynamic measurements. Miniaturized systems and sub-systems allow multiple physiological changes to be measured simultaneously and on a continuous basis under realistic conditions of daily living. The biological data and analog waveforms collected from these measurements can be conditioned for transmission over existing Agency communication channels, and modern data processing systems provide for the rapid reduction, correlation, and analysis of the enormous amount of biological data output.


25X1A



-2-

~~CONFIDENTIAL~~

25X1A



d. It is emphasized that this proposed program is, in fact, one of engineering and application rather than basic research. Much of the planned work is related to testing and evaluation and has to be done in Agency laboratories, which is the only place where suitable facilities exist for conducting these studies. Also, the evaluations should be conducted under the supervision of personnel familiar with the problems and the needs. Only by this method will the most promising system configurations be developed for successful application.

e. The monetary and personnel capabilities required over the 3-1/2 year period planned for the program are outlined in Attachment A; details of the proposed program are presented in the attached study, Attachment B.

4. Summary

a. The nature of the work involved in the Agency's operations requires personnel who have minimal physical impediments and a

~~CONFIDENTIAL~~

high degree of vigor, endurance, and resilience. Such requisites are indispensable in order to cope adequately with the stress and strains occasioned by uneven and uncertain hours and days of arduous, and not infrequently, hazardous work, and by duty in unhealthy locations with less than adequate medical facilities. The application of the proposed techniques will provide the first really sound method to appraise the durability of our personnel and to forecast efficiency and longevity in cases of our long-term investments. It will provide means to detect subclinical pathology so that preventive measures can be taken at an early date and before the employee's health degenerates to a lower level that impairs his effectiveness. It will extend electronically our diagnostic capabilities to our overseas stations.

b. Security-wise, this program will include studies on the validity of lie detection, the usefulness of improved sensors, and the effectiveness of adding new physiological indicators to the polygraph. The program will accomplish a long needed study concerning the patterning of physiological responses in lie detection. These studies will place polygraph interrogation technology on a firmer scientific basis and will provide the knowledge necessary for construction of a prototype machine that will collect more significant and meaningful parameters than the present model.

25X1A

5. Recommendations

It is recommended that:

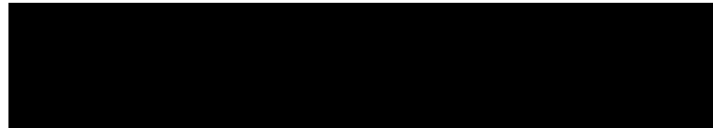
a. A Task Force comprised of one (1) representative each from the Medical Staff, Office of Security, Office of Communications, and the Automatic Data Processing Staff be established for the purpose of directing this program.

b. Seven (7) staff positions and \$204,968, as indicated in the attachment, be authorized in the current fiscal year to permit this program to be initiated on 1 January 1963.

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

c. Staff positions and funds for Fiscal Years 1964, 1965 and 1966, as indicated in the attachment, be approved to the extent necessary to insure that the program may continue for its full 3-1/2 year planned period.



25X1A

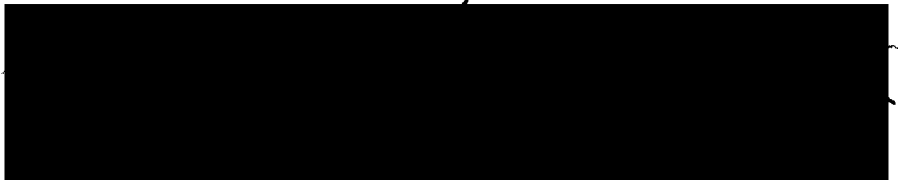
JOHN R. TIETJEN, M. D.
Chief, Medical Staff



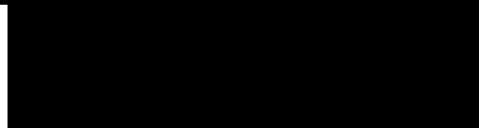
25X1A

SHEFFIELD EDWARDS
Director of Security

25X1A



25X1A



JOSEPH BECKER
Chief, Automatic Data Processing Staff

The recommendations contained in paragraph 5 are hereby approved.

(See attached memorandum dtd 3 Jun 63)

L. K. WHITE

Date

Deputy Director (Support)

2 Attachments:

1. Attachment A, Capabilities Required in Program for the Application of Bioelectronic Techniques and Systems to Monitor Human Physiological Responses
2. Attachment B, A Study and Master Plan for the Investigation and Application of Bio-Medical Electronic Techniques and Systems to Monitor and Record Human Physiological Responses

MS/CD/ [REDACTED] b7448 (23 Nov. 1962)

25X1A9a

Distribution:

- Orig. & 1 - C/MS
- 2 - DD/S
- 1 - D/S
- 1 - D/CO
- 1 - C/ADPS
- 2 - C/CD

1 - Ch. R&D Review Board (Eq. Reg.)

~~CONFIDENTIAL~~

25X1A1c

Approved For Release 2000/08/21 : CIA-RDP78-06180A000300170002-5

Approved For Release 2000/08/21 : CIA-RDP78-06180A000300170002-5